FACE MASK DETECTION

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Background:

COVID-19 pandemic has caused major issues world-wide. In the United States, it has been converted into a political warfare. In the beginning of the pandemic, it was told not to wear mask and they would not work. In the minds of many Americans that statement made an everlasting effect on everyone. It appears to have cause major confusion about wearing mask. Some people are going inside of business establishments while not wearing mask with some becoming violent towards the people working in businesses establishments. Many states now require people to wear mask while in public. With all the controversy, it is imperative to provide safety measures for the essential workers. Covid 19 is an airborne virus and a mask can stop the spread of aerosols. Using a face recognition detection system for mask, it could alert businesses with people entering the business establishments to detect people not wearing mask.

Dataset:

To create a deep learning model, many images must be available of people wearing masks and not wearing mask. The images must include people wearing sunglasses, helmets, faces shields or anything that would resemble something close to wearing a mask. From Kaggle, a dataset was available called Face Mask Detection. The model that was created from this dataset used environments with TensorFlow, Keras, OpenCV, and more.

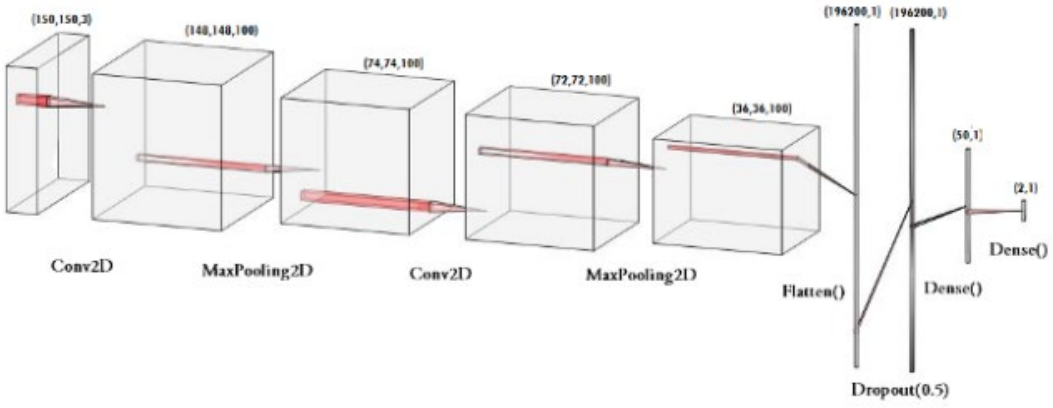
Data Preparation:

After looking through all of images, a group photo was selected. The group photo represented groups of people entering a location at the same time so a camera would capture different angles of the faces. The four images cropped out of the group photo for training the images. Machine learning models are equipped to dealing with numbers only. In other words, the images are converted to the facial coordinates and categorized by class name face_no_mask or face_with_mask

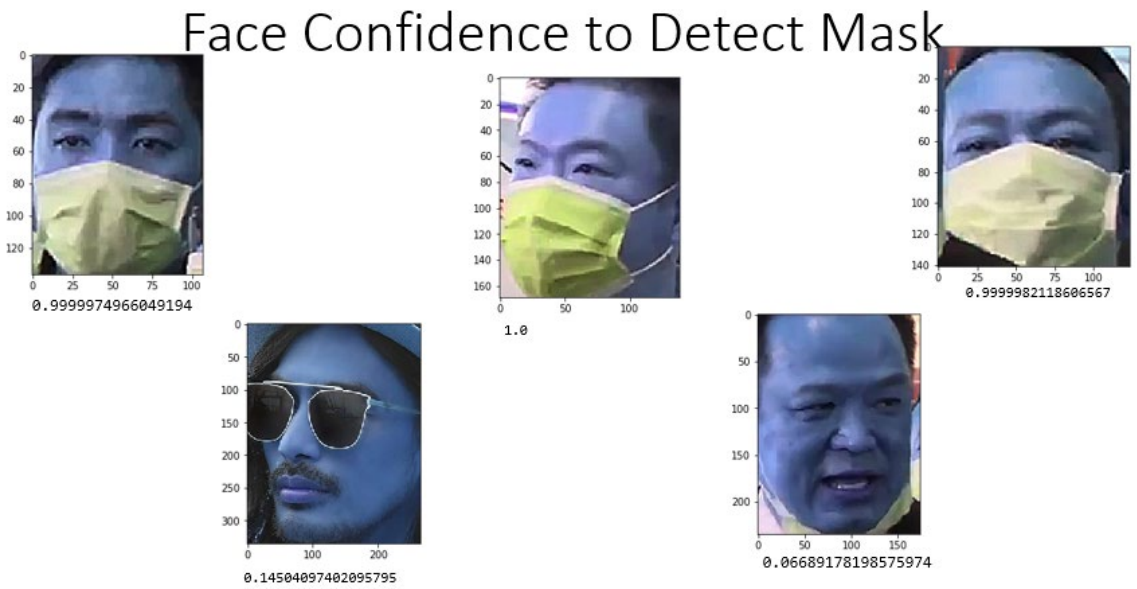
	name	x1	x2	y1	y2	classname
13381	1801.jpg	451	186	895	697	face_no_mask
3463	1802.jpg	110	71	273	272	face_with_mask
14835	1803.jpg	126	75	303	333	face_with_mask
5867	1804.jpg	112	113	262	307	face_with_mask
6194	1805.jpg	728	180	853	336	face_with_mask

Method:

Data was split into the training set which contain the images on which the CNN model will be trained and the test set with the images on which the model is tested. The model summary indicated that there were 307, 393 trainable parameters.



In the pre-processing of the images with keras, binary crossentropy was used, and it found 4311 images belonging to 2 classes and 1438 belonging to two classes which represents mask and no mask. After training the model at the 20th epoch, the model had around 95% accuracy and 96% with the validation accuracy. After building the model, the predictions were sufficient to identify a person wearing a mask and with no mask.



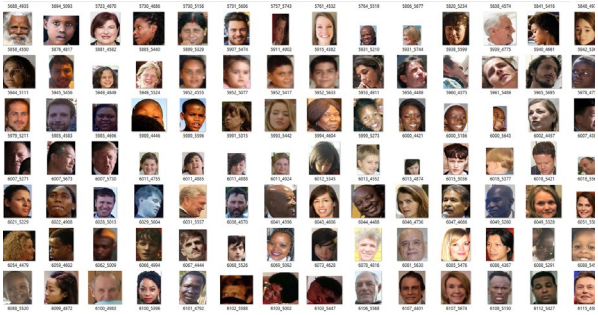
To confirm predictions, the model.predict was to print an array of predictions. Based upon 390 images at the beginning and end mask mean = 94.3% while the mask mean = 94.3% no mask mean = 15.3%.

Conclusion:

There were two folders created during this process called validation and training. Upon looking into validation folders which contained mask and no mask images, the model appeared to correctly identify people wearing mask verses not wearing a mask. The models that was created can be deployed and used in cameras to identify the people not wearing mask.

Face with Mask

Face with No Mask



Acknowledgments:

Wobot Intelligences

https://www.kaggle.com/wobotintelligence/face-mask-detection-dataset/kernels

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